Program: B.Tech in Computer Engineering   **Academic Year: 2022**   **Duration: 3 hours**

Date: 09.01.2023
Time: 10:30 am to 01:30 pm
Subject: Digital Signal Processing and Applications (Semester VII)   **Marks: 75**

Question No.		Max. Marks
Q1 (a)	Explain Cross correlation.	[05]
Q1 (b)	For **x(n)={1,3,-1,2,0,4}**. Plot the following discrete time signals. ↑ a. x(n+2) b. x(-n-1) c. x(n-1)δ(n-3) d. x(n)u(n-2) e. 2x(n)	[10]
Q2 (a)	Explain different applications of DSP. **OR** List and write statement for all DFT properties.	[10] [10]
Q2 (b)	If x(n) = {1,2,3,4} is periodic find x(2), x(9), x(15),x(102) ↑	[05]
Q3 (a)	Compare complex, real multiplications and additions of DFT & FFT. **OR** Discuss relation between DFT & DTFT.	[05] [05]
Q3 (b)	Given a sequence $x(n) = \{1, 2, 3, 4, 4, 3, 2, 1\}$, determine $X(k)$ using DIT FFT algorithm. **OR** Determine the IDFT of X(k)={3,(2+j), 1, (2-j)}.	[10] [10]
Q4 (a)	Elaborate different image file formats and Image types. **OR** What are the different connectivities and distance measures with respect to digital Images? Explain in detail. Also explain their use in Image processing	[10] [10]
Q4 (b)	Explain contrast stretching.	[05]
Q5 (a)	Apply histogram equalization and draw new equalized histogram of the following Image data.	[10]
Q5 (b)	Explain Hough transform.	[05]

Gray Levels	0	1	2	3	4	5	6	7
Number of Pixels	200	170	110	80	60	80	140	160